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Document Name: SAE J576: Plastic Materials for Use in Optical Parts, such as Lenses and Reflectors, of Motor Vehicle Lighting Devices

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PLASTIC MATERIALS FOR USE IN OPTICAL PARTS, SUCH AS LENSES AND REFLECTORS, OF MOTOR VEHICLE LIGHTING DEVICES—SAE J576c SAE Recommended Practice

Report of Lighting and Nonmetallic Materials Committees approved January 1955 and last revised July 1965 and last revised May 1970.

[SAE lighting standards and recommended practices are subject to frequent change to keep pace with technical advances. Hence, their requirements should not be incorporated in laws where flexibility of revision is lacking.]

1. Scope—This SAE Recommended Practice provides test methods and requirements to evaluate the suitability of plastic materials intended for optical applications in motor vehicles. The tests of this practice are intended to determine physical and optical characteristics of the material only, and are not intended to cover the performance of plastics when molded and installed in a finished assembly. Performance expectations of such a finished assembly, including its plastic components, are to be based on tests of lamps, and so forth, as specified in SAE Standards and Recommended Practices for motor vehicle lighting lamps and reflectors.

2. Definitions

2.1 **Material**—For the purpose of this recommended practice, the term "material" broadly includes type and grade of plastics, composition, or manufacturer's designation (number) and color.

3. Test Procedures

3.1 **Materials To Be Tested**—These tests shall be made of each material to be offered for use in optical parts employed in motor vehicle lighting equipment, using colors defined in SAE J578. A test of one color and formulation shall cover variations in dye concentration, but shall not cover changes in dye materials or changes in polymers.

3.2 **Types of Tests**—Two basic types of tests are employed: an Outdoor Exposure Test and a Heat Test.

3.3 **Samples Required**—

3.3.1 General—Samples of plastic shall be injection molded into polished molds to produce 3 in. diameter discs with two faces flat and parallel. In both tests each exposed surface of the samples should contain a minimum uninterrupted area of 5 sq. in.

3.3.2 Thickness—Samples shall be furnished in the following thicknesses:

THICKNESS, IN.	TOLERANCE, IN.
0.062	±0.005
0.125	±0.005
0.250	±0.005

3.3.3 Number of Samples Required—

Outdoor Exposure Test: 1 sample/each thickness/each site × 2 sites for each material = 2 samples/each thickness for each material

Heat Test: 2 samples/each thickness for each material = 2 samples/each thickness for each material

Control: 1 sample/each thickness for each material = 1 sample each

NOTE: This specimen must be kept properly protected from influences which may change its appearance and properties.

Total: = 5 samples/each thickness for each material

3.4 **Outdoor Exposure Test**—

3.4.1 Exposure Sites—Florida (warm, moist climate) and Arizona (warm climate).

3.4.2 Sample Mounting—One sample of each thickness of each material at each test station shall be mounted at a 45 deg angle to the vertical, facing south. The exposed surface of the samples shall contain a minimum uninterrupted area of 5 sq in., and they shall be mounted in the open no closer than 12 in. to their background.

3.4.3 Exposure Time and Conditions—The time of exposure shall be three years. During this time samples shall be cleaned at least once every three months by washing with mild soap and water, and then rinsing. Rubbing shall be avoided.

3.5 **Heat Test**—

3.5.1 Sample Mounting—Two samples of each thickness of each material shall be supported in the vertical position with not more than 1 in. segments at the bottoms retained in the fixtures, thereby leaving the upper 5 sq in. of surface area on each side of each sample uncovered and unsupported.

3.5.2 TEST TIME AND TEMPERATURE—The samples shall be placed for two hours in a circulating air oven at 175 ± 5 F.

3.6 **Luminous Transmittance and Color Measurements**—Measurements shall be made in accordance with ASTM D 791, Method of Test for Luminous Reflectance, Transmittance and Color of Materials.

4. *Material Performance Requirements*—A material will be said to conform to this Recommended Practice in a range of thicknesses stated by the materials manufacturer if the following conditions are met.

4.1 **Before Exposure to any Tests**—The trichromatic coefficients for that stated range of thicknesses conforms to the requirements of SAE J578.

4.2 **After Outdoor Exposure**—

4.2.1 LUMINOUS TRANSMITTANCE—The luminous transmittance of the exposed samples using CIE Illuminant A (2854 K) shall not have changed by more than 25% of the luminous transmittance of the unexposed control sample when tested in accordance with ASTM D 791.

4.2.2 APPEARANCE—The exposed samples, when compared with the unexposed control samples, shall not show surface deterioration, crazing, haze, dimensional changes, color bleeding, delamination, or loss of surface luster.

4.2.3 TRICHROMATIC COEFFICIENTS—In the stated range of thicknesses, the trichromatic coefficients for that range of thicknesses shall conform to the requirements of SAE J578.

4.3 **After Heat Test**—

4.3.1 APPEARANCE—After exposure to the heat test and cooling to room temperature, the samples shall show no significant change in shape and general appearance when compared with corresponding unexposed control samples.

4.3.2 TRICHROMATIC COEFFICIENTS—After exposure to the heat test and cooling to room temperature, the trichromatic coefficients of the samples in the stated range of thickness shall conform to the requirements of SAE J578.

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